

## SEQUENCE LISTING

<110> Steward, Lance E.  
Fernandez-Salas, Ester  
Herrington, Todd  
Aoki, Kei Roger

<120> Clostridial Neurotoxin Compositions and  
Modified Clostridial Neurotoxins

<130> 17355CIP3 (BOT)

<140> US 10/757,077  
<141> 2004-01-14

<150> US 09/910,346  
<151> 2001-07-20

<150> US 09/620,840  
<151> 2000-07-21

<150> US 10/163,106  
<151> 2003-06-04

<160> 148

<170> FastSEQ for Windows Version 4.0

<210> 1  
<211> 7  
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<213> Clostridium botulinum serotype A

<400> 1  
Phe Glu Phe Tyr Lys Leu Leu  
1 5

<210> 2  
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<212> PRT  
<213> Rattus norvegicus

<400> 2  
Glu Glu Lys Arg Ala Ile Leu  
1 5

<210> 3  
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<212> PRT  
<213> Rattus norvegicus

&lt;400&gt; 3

Glu Glu Lys Met Ala Ile Leu

1

5

&lt;210&gt; 4

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Rattus norvegicus

&lt;400&gt; 4

Ser Glu Arg Asp Val Leu Leu

1

5

&lt;210&gt; 5

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Rattus norvegicus

&lt;400&gt; 5

Val Asp Thr Gln Val Leu Leu

1

5

&lt;210&gt; 6

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Mus musculus

&lt;400&gt; 6

Ala Glu Val Gln Ala Leu Leu

1

5

&lt;210&gt; 7

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Xenopus laevis

&lt;400&gt; 7

Ser Asp Lys Gln Asn Leu Leu

1

5

&lt;210&gt; 8

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Gallus gallus

&lt;400&gt; 8

Ser Asp Arg Gln Asn Leu Ile

1

5

<210> 9  
<211> 7  
<212> PRT  
<213> *Ovis aries*

<400> 9  
Ala Asp Thr Gln Val Leu Met  
1 5

<210> 10  
<211> 7  
<212> PRT  
<213> *Homo sapiens*

<400> 10  
Ser Asp Lys Asn Thr Leu Leu  
1 5

<210> 11  
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<213> *Homo sapiens*

<400> 11  
Ser Gln Ile Lys Arg Leu Leu  
1 5

<210> 12  
<211> 7  
<212> PRT  
<213> *Homo sapiens*

<400> 12  
Ala Asp Thr Gln Ala Leu Leu  
1 5

<210> 13  
<211> 7  
<212> PRT  
<213> *Saccharomyces cerevisiae*

<400> 13  
Asn Glu Gln Ser Pro Leu Leu  
1 5

<210> 14  
<211> 12  
<212> PRT  
<213> *Clostridium botulinum* serotype A

&lt;400&gt; 14

Met	Pro	Phe	Val	Asn	Lys	Gln	Phe	Asn	Tyr	Lys	Asp
1				5					10		

&lt;210&gt; 15

&lt;211&gt; 11

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype A

&lt;400&gt; 15

Pro	Phe	Val	Asn	Lys	Gln	Phe	Asn	Tyr	Lys	Asp
1			5						10	

&lt;210&gt; 16

&lt;211&gt; 4

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype A

&lt;400&gt; 16

Met	Tyr	Lys	Asp
1			

&lt;210&gt; 17

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; SITE

&lt;222&gt; (1)...(7)

&lt;223&gt; Consensus sequence for Leucine-based motif.

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(1)

&lt;223&gt; Xaa is any amino acid.

&lt;221&gt; VARIANT

&lt;222&gt; (3)...(5)

&lt;223&gt; Xaa is any amino acid.

&lt;400&gt; 17

Xaa	Asp	Xaa	Xaa	Xaa	Leu	Leu
1				5		

&lt;210&gt; 18

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; SITE

<222> (1)...(7)

<223> Consensus sequence for Leucine-based motif.

<221> VARIANT

<222> (1)...(1)

<223> Xaa is any amino acid.

<221> VARIANT

<222> (3)...(5)

<223> Xaa is any amino acid.

<400> 18

Xaa Glu Xaa Xaa Xaa Leu Leu  
1 5

<210> 19

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

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<222> (1)...(7)

<223> Consensus sequence for Leucine-based motif.

<221> VARIANT

<222> (1)...(1)

<223> Xaa is any amino acid.

<221> VARIANT

<222> (3)...(5)

<223> Xaa is any amino acid.

<400> 19

Xaa Asp Xaa Xaa Xaa Leu Ile  
1 5

<210> 20

<211> 7

<212> PRT

<213> Artificial Sequence

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<221> SITE

<222> (1)...(7)

<223> Consensus sequence for Leucine-based motif.

<221> VARIANT

<222> (1)...(1)

<223> Xaa is any amino acid.

<221> VARIANT

<222> (3)...(5)

<223> Xaa is any amino acid.

<400> 20

Xaa Asp Xaa Xaa Xaa Leu Met

1

5

<210> 21

<211> 7

<212> PRT

<213> Artificial Sequence

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<221> SITE

<222> (1)...(7)

<223> Consensus sequence for Leucine-based motif.

<221> VARIANT

<222> (1)...(1)

<223> Xaa is any amino acid.

<221> VARIANT

<222> (3)...(5)

<223> Xaa is any amino acid.

<400> 21

Xaa Glu Xaa Xaa Xaa Leu Ile

1

5

<210> 22

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<221> SITE

<222> (1)...(7)

<223> Consensus sequence for Leucine-based motif.

<221> VARIANT

<222> (1)...(1)

<223> Xaa is any amino acid.

<221> VARIANT

<222> (3)...(5)

<223> Xaa is any amino acid.

<400> 22

Xaa Glu Xaa Xaa Xaa Ile Leu

1

5

<210> 23

<211> 7

<212> PRT  
<213> Artificial Sequence

<220>  
<221> SITE  
<222> (1)...(7)  
<223> Consensus sequence for Leucine-based motif.

<221> VARIANT  
<222> (1)...(1)  
<223> Xaa is any amino acid.

<221> VARIANT  
<222> (3)...(5)  
<223> Xaa is any amino acid.

<400> 23  
Xaa Glu Xaa Xaa Xaa Leu Met  
1 5

<210> 24  
<211> 4  
<212> PRT  
<213> Artificial Sequence

<220>  
<221> SITE  
<222> (1)...(4)  
<223> Consensus sequence for Tyrosine-based motif.

<221> VARIANT  
<222> (2)...(3)  
<223> Xaa is any amino acid.

<221> VARIANT  
<222> (4)...(4)  
<223> Xaa is any hydrophobic amino acid.

<400> 24  
Tyr Xaa Xaa Xaa  
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<210> 25  
<211> 50  
<212> PRT  
<213> Artificial Sequence

<220>  
<221> PEPTIDE  
<222> (1)...(50)  
<223> Peptide comprising a 6x His tag and S-tag

<400> 25

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Met His His His His His Ser Ser Gly Leu Val Pro Arg Gly Ser
 1          5          10          15
Gly Met Lys Glu Thr Ala Ala Ala Lys Phe Glu Arg Gln His Met Asp
          20          25          30
Ser Pro Asp Leu Gly Thr Asp Asp Asp Asp Lys Ala Met Tyr Lys Asp
          35          40          45
Pro Val
      50

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<210> 26
<211> 14
<212> PRT
<213> Artificial Sequence

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<220>
<221> PEPTIDE
<222> (1)...(14)
<223> Peptide comprising a 6x His tag

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<400> 26
Asn Phe Thr Lys Leu Thr Arg Ala His His His His His
 1          5          10

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<210> 27
<211> 8
<212> PRT
<213> Clostridium botulinum serotype A

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<400> 27
Pro Phe Val Asn Lys Gln Phe Asn
 1          5

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<210> 28
<211> 22
<212> PRT
<213> Clostridium botulinum serotype A

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<400> 28
Lys Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg
 1          5          10          15
Gly Ile Ile Thr Ser Lys
          20

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<210> 29
<211> 438
<212> PRT
<213> Clostridium botulinum serotype A

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<400> 29
Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val Asn Gly
 1          5          10          15

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Val Asp Ile Ala Tyr Ile Lys Ile Pro Asn Ala Gly Gln Met Gln Pro  
 20 25 30  
 Val Lys Ala Phe Lys Ile His Asn Lys Ile Trp Val Ile Pro Glu Arg  
 35 40 45  
 Asp Thr Phe Thr Asn Pro Glu Glu Gly Asp Leu Asn Pro Pro Pro Glu  
 50 55 60  
 Ala Lys Gln Val Pro Val Ser Tyr Tyr Asp Ser Thr Tyr Leu Ser Thr  
 65 70 75 80  
 Asp Asn Glu Lys Asp Asn Tyr Leu Lys Gly Val Thr Lys Leu Phe Glu  
 85 90 95  
 Arg Ile Tyr Ser Thr Asp Leu Gly Arg Met Leu Leu Thr Ser Ile Val  
 100 105 110  
 Arg Gly Ile Pro Phe Trp Gly Gly Ser Thr Ile Asp Thr Glu Leu Lys  
 115 120 125  
 Val Ile Asp Thr Asn Cys Ile Asn Val Ile Gln Pro Asp Gly Ser Tyr  
 130 135 140  
 Arg Ser Glu Glu Leu Asn Leu Val Ile Ile Gly Pro Ser Ala Asp Ile  
 145 150 155 160  
 Ile Gln Phe Glu Cys Lys Ser Phe Gly His Glu Val Leu Asn Leu Thr  
 165 170 175  
 Arg Asn Gly Tyr Gly Ser Thr Gln Tyr Ile Arg Phe Ser Pro Asp Phe  
 180 185 190  
 Thr Phe Gly Phe Glu Glu Ser Leu Glu Val Asp Thr Asn Pro Leu Leu  
 195 200 205  
 Gly Ala Gly Lys Phe Ala Thr Asp Pro Ala Val Thr Leu Ala His Glu  
 210 215 220  
 Leu Ile His Ala Gly His Arg Leu Tyr Gly Ile Ala Ile Asn Pro Asn  
 225 230 235 240  
 Arg Val Phe Lys Val Asn Thr Asn Ala Tyr Tyr Glu Met Ser Gly Leu  
 245 250 255  
 Glu Val Ser Phe Glu Glu Leu Arg Thr Phe Gly Gly His Asp Ala Lys  
 260 265 270  
 Phe Ile Asp Ser Leu Gln Glu Asn Glu Phe Arg Leu Tyr Tyr Asn  
 275 280 285  
 Lys Phe Lys Asp Ile Ala Ser Thr Leu Asn Lys Ala Lys Ser Ile Val  
 290 295 300  
 Gly Thr Thr Ala Ser Leu Gln Tyr Met Lys Asn Val Phe Lys Glu Lys  
 305 310 315 320  
 Tyr Leu Leu Ser Glu Asp Thr Ser Gly Lys Phe Ser Val Asp Lys Leu  
 325 330 335  
 Lys Phe Asp Lys Leu Tyr Lys Met Leu Thr Glu Ile Tyr Thr Glu Asp  
 340 345 350  
 Asn Phe Val Lys Phe Phe Lys Val Leu Asn Arg Lys Thr Tyr Leu Asn  
 355 360 365  
 Phe Asp Lys Ala Val Phe Lys Ile Asn Ile Val Pro Lys Val Asn Tyr  
 370 375 380  
 Thr Ile Tyr Asp Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn  
 385 390 395 400  
 Phe Asn Gly Gln Asn Thr Glu Ile Asn Asn Met Asn Phe Thr Lys Leu  
 405 410 415  
 Lys Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg  
 420 425 430  
 Gly Ile Ile Thr Ser Lys  
 435

<210> 30  
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 <212> PRT  
 <213> Clostridium botulinum sertotype B  
  
 <400> 30  
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 1 5 10 15  
 Asn Asn Ile Ile Met Met Glu Pro Pro Phe Ala Arg Gly Thr Gly Arg  
 20 25 30  
 Tyr Tyr Lys Ala Phe Lys Ile Thr Asp Arg Ile Trp Ile Ile Pro Glu  
 35 40 45  
 Arg Tyr Thr Phe Gly Tyr Lys Pro Glu Asp Phe Asn Lys Ser Ser Gly  
 50 55 60  
 Ile Phe Asn Arg Asp Val Cys Glu Tyr Tyr Asp Pro Asp Tyr Leu Asn  
 65 70 75 80  
 Thr Asn Asp Lys Lys Asn Ile Phe Leu Gln Thr Met Ile Lys Leu Phe  
 85 90 95  
 Asn Arg Ile Lys Ser Lys Pro Leu Gly Glu Lys Leu Leu Glu Met Ile  
 100 105 110  
 Ile Asn Gly Ile Pro Tyr Leu Gly Asp Arg Arg Val Pro Leu Glu Glu  
 115 120 125  
 Phe Asn Thr Asn Ile Ala Ser Val Thr Val Asn Lys Leu Ile Ser Asn  
 130 135 140  
 Pro Gly Glu Val Glu Arg Lys Lys Gly Ile Phe Ala Asn Leu Ile Ile  
 145 150 155 160  
 Phe Gly Pro Gly Pro Val Leu Asn Glu Asn Glu Thr Ile Asp Ile Gly  
 165 170 175  
 Ile Gln Asn His Phe Ala Ser Arg Glu Gly Phe Gly Gly Ile Met Gln  
 180 185 190  
 Met Lys Phe Cys Pro Glu Tyr Val Ser Val Phe Asn Asn Val Gln Glu  
 195 200 205  
 Asn Lys Gly Ala Ser Ile Phe Asn Arg Arg Gly Tyr Phe Ser Asp Pro  
 210 215 220  
 Ala Leu Ile Leu Met His Glu Leu Ile His Val Leu His Gly Leu Tyr  
 225 230 235 240  
 Gly Ile Lys Val Asp Asp Leu Pro Ile Val Pro Asn Glu Lys Lys Phe  
 245 250 255  
 Phe Met Gln Ser Thr Asp Ala Ile Gln Ala Glu Glu Leu Tyr Thr Phe  
 260 265 270  
 Gly Gly Gln Asp Pro Ser Ile Ile Thr Pro Ser Thr Asp Lys Ser Ile  
 275 280 285  
 Tyr Asp Lys Val Leu Gln Asn Phe Arg Gly Ile Val Asp Arg Leu Asn  
 290 295 300  
 Lys Val Leu Val Cys Ile Ser Asp Pro Asn Ile Asn Ile Asn Ile Tyr  
 305 310 315 320  
 Lys Asn Lys Phe Lys Asp Lys Tyr Lys Phe Val Glu Asp Ser Glu Gly  
 325 330 335  
 Lys Tyr Ser Ile Asp Val Glu Ser Phe Asp Lys Leu Tyr Lys Ser Leu  
 340 345 350  
 Met Phe Gly Phe Thr Glu Thr Asn Ile Ala Glu Asn Tyr Lys Ile Lys  
 355 360 365  
 Thr Arg Ala Ser Tyr Phe Ser Asp Ser Leu Pro Pro Val Lys Ile Lys  
 370 375 380

Asn Leu Leu Asp Asn Glu Ile Tyr Thr Ile Glu Glu Gly Phe Asn Ile  
385 390 395 400  
Ser Asp Lys Asp Met Glu Lys Glu Tyr Arg Gly Gln Asn Lys Ala Ile  
405 410 415  
Asn Lys Gln Ala Tyr Glu Glu Ile Ser Lys Glu His Leu Ala Val Tyr  
420 425 430  
Lys Ile Gln Met Cys Lys Ser Val Lys  
435 440

<210> 31  
<211> 4  
<212> PRT  
<213> Clostridium botulinum serotype A

<220>  
<221> PHOSPHORYLATION  
<222> (1)...(4)  
<223> Tyrosine-based motif

<400> 31  
Tyr Ile Lys Ile  
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<210> 32  
<211> 4  
<212> PRT  
<213> Clostridium botulinum serotype A

<220>  
<221> PHOSPHORYLATION  
<222> (1)...(4)  
<223> Tyrosine-based motif

<400> 32  
Tyr Asp Ser Thr  
1

<210> 33  
<211> 4  
<212> PRT  
<213> Clostridium botulinum serotype A

<220>  
<221> PHOSPHORYLATION  
<222> (1)...(4)  
<223> Tyrosine-based motif

<400> 33  
Tyr Gly Ser Thr  
1

<210> 34  
<211> 4  
<212> PRT  
<213> Clostridium botulinum serotype A

<220>  
<221> PHOSPHORYLATION  
<222> (1)...(4)  
<223> Tyrosine-based motif

<400> 34  
Tyr Asn Lys Phe  
1

<210> 35  
<211> 4  
<212> PRT  
<213> Clostridium botulinum serotype A

<220>  
<221> PHOSPHORYLATION  
<222> (1)...(4)  
<223> Tyrosine-based motif

<400> 35  
Tyr Met Lys Asn  
1

<210> 36  
<211> 4  
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<213> Clostridium botulinum serotype A

<220>  
<221> PHOSPHORYLATION  
<222> (1)...(4)  
<223> Tyrosine-based motif

<400> 36  
Tyr Leu Asn Phe  
1

<210> 37  
<211> 4  
<212> PRT  
<213> Clostridium botulinum serotype A

<220>  
<221> PHOSPHORYLATION  
<222> (1)...(4)  
<223> Tyrosine-based motif

&lt;400&gt; 37

Tyr Asp Gly Phe

1

&lt;210&gt; 38

&lt;211&gt; 4

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype A

&lt;220&gt;

&lt;221&gt; PHOSPHORYLATION

&lt;222&gt; (1)...(4)

&lt;223&gt; Tyrosine-based motif

&lt;400&gt; 38

Tyr Lys Leu Leu

1

&lt;210&gt; 39

&lt;211&gt; 30

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype A

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(30)

&lt;223&gt; Amino terminal 30 amino acids of light chain

&lt;400&gt; 39

Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val Asn Gly

1

5

10

15

Val Asp Ile Ala Tyr Ile Lys Ile Pro Asn Ala Gly Gln Met

20

25

30

&lt;210&gt; 40

&lt;211&gt; 50

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype A

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(50)

&lt;223&gt; Carboxyl terminal 50 amino acids of light chain

&lt;400&gt; 40

Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln

1

5

10

15

Asn Thr Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys Asn Phe Thr

20

25

30

Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly Ile Ile Thr

35

40

45

Ser Lys

50

<210> 41  
<211> 30  
<212> PRT  
<213> Clostridium botulinum serotype B  
  
<220>  
<221> DOMAIN  
<222> (13)...(30)  
<223> Amino terminal 30 amino acids of light chain  
  
<400> 41  
Met Pro Val Thr Ile Asn Asn Phe Asn Tyr Asn Asp Pro Ile Asp Asn  
1 5 10 15  
Asp Asn Ile Ile Met Met Glu Pro Pro Phe Ala Arg Gly Thr  
20 25 30

<210> 42  
<211> 50  
<212> PRT  
<213> Clostridium botulinum serotype B  
  
<220>  
<221> DOMAIN  
<222> (1)...(50)  
<223> Carboxyl terminal 50 amino acids of light chain  
  
<400> 42  
Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly Lys  
1 5 10 15  
Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Tyr Glu Glu  
20 25 30  
Ile Ser Lys Glu His Leu Ala Val Tyr Lys Ile Gln Met Cys Lys Ser  
35 40 45  
Val Lys  
50

<210> 43  
<211> 30  
<212> PRT  
<213> Clostridium botulinum serotype C1  
  
<220>  
<221> DOMAIN  
<222> (1)...(30)  
<223> Amino terminal 30 amino acids of light chain  
  
<400> 43  
Met Pro Ile Thr Ile Asn Asn Phe Asn Tyr Ser Asp Pro Val Asp Asn  
1 5 10 15  
Lys Asn Ile Leu Tyr Leu Asp Thr His Leu Asn Thr Leu Ala

20

25

30

<210> 44  
 <211> 50  
 <212> PRT  
 <213> Clostridium botulinum serotype C1  
  
 <220>  
 <221> DOMAIN  
 <222> (1)...(50)  
 <223> Carboxyl terminal 50 amino acids of light chain

<400> 44  
 Asn Ile Pro Lys Ser Asn Leu Asn Val Leu Phe Met Gly Gln Asn Leu  
 1 5 10 15  
 Ser Arg Asn Pro Ala Leu Arg Lys Val Asn Pro Glu Asn Met Leu Tyr  
 20 25 30  
 Leu Phe Thr Lys Phe Cys His Lys Ala Ile Asp Gly Arg Ser Leu Tyr  
 35 40 45  
 Asn Lys  
 50

<210> 45  
 <211> 30  
 <212> PRT  
 <213> Clostridium botulinum serotype D  
  
 <220>  
 <221> DOMAIN  
 <222> (1)...(30)  
 <223> Amino terminal 30 amino acids of light chain

<400> 45  
 Met Thr Trp Pro Val Lys Asp Phe Asn Tyr Ser Asp Pro Val Asn Asp  
 1 5 10 15  
 Asn Asp Ile Leu Tyr Leu Arg Ile Pro Gln Asn Lys Leu Ile  
 20 25 30

<210> 46  
 <211> 50  
 <212> PRT  
 <213> Clostridium botulinum serotype D  
  
 <220>  
 <221> DOMAIN  
 <222> (1)...(50)  
 <223> Carboxyl terminal 50 amino acids of light chain

<400> 46  
 Tyr Thr Ile Arg Asp Gly Phe Asn Leu Thr Asn Lys Gly Phe Asn Ile  
 1 5 10 15  
 Glu Asn Ser Gly Gln Asn Ile Glu Arg Asn Pro Ala Leu Gln Lys Leu

20 25 30  
Ser Ser Glu Ser Val Val Asp Leu Phe Thr Lys Val Cys Leu Arg Leu  
35 40 45  
Thr Lys  
50

&lt;210&gt; 47

&lt;211&gt; 30

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype E

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(30)

&lt;223&gt; Amino terminal 30 amino acid of light chain

&lt;400&gt; 47

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg  
1 5 10 15  
Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr  
20 25 30

&lt;210&gt; 48

&lt;211&gt; 50

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype E

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(50)

&lt;223&gt; Carboxyl terminal 50 amino acids of light chain

&lt;400&gt; 48

Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe Arg Gly Gln Asn Ala  
1 5 10 15  
Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr Gly Arg Gly Leu Val  
20 25 30  
Lys Lys Ile Ile Arg Phe Cys Lys Asn Ile Val Ser Val Lys Gly Ile  
35 40 45  
Arg Lys  
50

&lt;210&gt; 49

&lt;211&gt; 30

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype F

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(30)

&lt;223&gt; Amino terminal 30 amino acids of light chain

&lt;400&gt; 49

Met	Pro	Val	Ala	Ile	Asn	Ser	Phe	Asn	Tyr	Asn	Asp	Pro	Val	Asn	Asp
1				5				10						15	
Asp	Thr	Ile	Leu	Tyr	Met	Gln	Ile	Pro	Tyr	Glu	Glu	Lys	Ser		
			20					25					30		

&lt;210&gt; 50

&lt;211&gt; 50

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype F

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(50)

&lt;223&gt; Carboxyl terminal 50 amino acids of light chain

&lt;400&gt; 50

Thr	Val	Ser	Glu	Gly	Phe	Asn	Ile	Gly	Asn	Leu	Ala	Val	Asn	Asn	Arg
1				5				10						15	
Gly	Gln	Ser	Ile	Lys	Leu	Asn	Pro	Lys	Ile	Ile	Asp	Ser	Ile	Pro	Asp
			20					25					30		
Lys	Gly	Leu	Val	Glu	Lys	Ile	Val	Lys	Phe	Cys	Lys	Ser	Val	Ile	Pro
		35					40					45			
Arg	Lys														
	50														

&lt;210&gt; 51

&lt;211&gt; 30

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype G

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(30)

&lt;223&gt; Amino terminal 30 amino acids of light chain

&lt;400&gt; 51

Met	Pro	Val	Asn	Ile	Lys	Asn	Phe	Asn	Tyr	Asn	Asp	Pro	Ile	Asn	Asn
1				5				10						15	
Asp	Asp	Ile	Ile	Met	Met	Glu	Pro	Phe	Asn	Asp	Pro	Gly	Pro		
			20					25					30		

&lt;210&gt; 52

&lt;211&gt; 50

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype G

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(50)

&lt;223&gt; Carboxyl terminal 50 amino acids of light chain

<210> 53  
<211> 30  
<212> PRT  
<213> Clostridium botulinum serotype A

```
<220>
<221> DOMAIN
<222> (1)...(30)
<223> Amino terminal 30 amino acids of light chain

<221> VARIANT
<222> (4)...(4)
<223> Alanine substitution
```

```

<400> 53
Met Pro Phe Ala Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val Asn Gly
 1          5          10          15
Val Asp Ile Ala Tyr Ile Lys Ile Pro Asn Ala Gly Gln Met
      20          25          30

```

```
<210> 54
<211> 50
<212> PRT
<213> Clostridium botulinum serotype A
```

```
<220>
<221> DOMAIN
<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT
<222> (25)...(25)
<223> Arginine substitution
```

```

<400> 54
  Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln
   1          5          10          15
Asn Thr Glu Ile Asn Asn Met Asn Arg Thr Lys Leu Lys Asn Phe Thr
   20          25          30
Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly Ile Ile Thr
   35          40          45
Ser Lys
   50

```

<210> 55  
<211> 30  
<212> PRT  
<213> Clostridium botulinum serotype A

<220>  
<221> DOMAIN  
<222> (1)...(30)  
<223> Amino terminal 30 amino acids of light chain

<221> VARIANT  
<222> (10)...(10)  
<223> Lysine substitution

<400> 55  
Met Pro Phe Val Asn Lys Gln Phe Asn Lys Lys Asp Pro Val Asn Gly  
1 5 10 15  
Val Asp Ile Ala Tyr Ile Lys Ile Pro Asn Ala Gly Gln Met  
20 25 30

<210> 56  
<211> 50  
<212> PRT  
<213> Clostridium botulinum serotype A

<220>  
<221> DOMAIN  
<222> (1)...(50)  
<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT  
<222> (31)...(31)  
<223> Alanine substitution

<221> VARIANT  
<222> (32)...(32)  
<223> Alanine substitution

<400> 56  
Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln  
1 5 10 15  
Asn Thr Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys Asn Ala Ala  
20 25 30  
Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly Ile Ile Thr  
35 40 45  
Ser Lys  
50

<210> 57  
<211> 30  
<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (21)...(21)

<223> Arginine substitution

<400> 57

Met	Pro	Phe	Val	Asn	Lys	Gln	Phe	Asn	Tyr	Lys	Asp	Pro	Val	Asn	Gly
1				5				10					15		
Val	Asp	Ile	Ala	Arg	Ile	Lys	Ile	Pro	Asn	Ala	Gly	Gln	Met		
		20						25					30		

<210> 58

<211> 50

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> DOMAIN

<222> (1)...(50)

<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT

<222> (13)...(13)

<223> Histidine substitution

<400> 58

Gly	Phe	Asn	Leu	Arg	Asn	Thr	Asn	Leu	Ala	Ala	Asn	His	Asn	Gly	Gln
1				5				10					15		
Asn	Thr	Glu	Ile	Asn	Asn	Met	Asn	Phe	Thr	Lys	Leu	Lys	Asn	Phe	Thr
		20						25				30			
Gly	Leu	Phe	Glu	Phe	Tyr	Lys	Leu	Leu	Cys	Val	Arg	Gly	Ile	Ile	Thr
		35					40					45			
Ser	Lys														
	50														

<210> 59

<211> 30

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (7)...(7)

<223> Histidine substitution

<400> 59

```
Met Pro Phe Val Asn Lys His Phe Asn Tyr Lys Asp Pro Val Asn Gly
 1           5           10           15
Val Asp Ile Ala Tyr Ile Lys Ile Pro Asn Ala Gly Gln Met
      20           25           30
```

<210> 60

<211> 50

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> DOMAIN

<222> (1)...(50)

<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT

<222> (43)...(43)

<223> Alanine substitution

<400> 60

```
Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln
 1           5           10           15
Asn Thr Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys Asn Phe Thr
      20           25           30
Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Ala Arg Gly Ile Ile Thr
      35           40           45
Ser Lys
      50
```

<210> 61

<211> 30

<212> PRT

<213> Clostridium botulinum serotype B

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (3)...(3)

<223> Alanine substitution

<400> 61

```
Met Pro Ala Thr Ile Asn Asn Phe Asn Tyr Asn Asp Pro Ile Asp Asn
 1           5           10           15
Asp Asn Ile Ile Met Met Glu Pro Pro Phe Ala Arg Gly Thr
      20           25           30
```

<210> 62  
<211> 50  
<212> PRT  
<213> Clostridium botulinum serotype B

<220>  
<221> DOMAIN  
<222> (1)...(50)  
<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT  
<222> (44)...(44)  
<223> Arginine substitution

<400> 62  
Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly Lys  
1 5 10 15  
Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Tyr Glu Glu  
20 25 30  
Ile Ser Lys Glu His Leu Ala Val Tyr Lys Ile Arg Met Cys Lys Ser  
35 40 45  
Val Lys  
50

<210> 63  
<211> 30  
<212> PRT  
<213> Clostridium botulinum serotype B

<220>  
<221> DOMAIN  
<222> (1)...(30)  
<223> Amino terminal 30 amino acids of light chain

<221> VARIANT  
<222> (21)...(21)  
<223> Alanine substitution

<221> VARIANT  
<222> (22)...(22)  
<223> Alanine substitution

<400> 63  
Met Pro Val Thr Ile Asn Asn Phe Asn Tyr Asn Asp Pro Ile Asp Asn  
1 5 10 15  
Asp Asn Ile Ile Ala Ala Glu Pro Pro Phe Ala Arg Gly Thr  
20 25 30

<210> 64  
<211> 50  
<212> PRT  
<213> Clostridium botulinum serotype B

<220>  
<221> DOMAIN  
<222> (1)...(50)  
<223> Carboxyl terminal 50 amino acids of light chain  
  
<221> VARIANT  
<222> (41)...(41)  
<223> Arginine substitution  
  
<400> 64  
Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly Lys  
1 5 10 15  
Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Tyr Glu Glu  
20 25 30  
Ile Ser Lys Glu His Leu Ala Val Arg Lys Ile Gln Met Cys Lys Ser  
35 40 45  
Val Lys  
50

<210> 65  
<211> 30  
<212> PRT  
<213> Clostridium botulinum serotype B  
  
<220>  
<221> DOMAIN  
<222> (1)...(30)  
<223> Amino terminal 30 amino acids of light chain  
  
<221> VARIANT  
<222> (10)...(10)  
<223> Arginine substitution

<400> 65  
Met Pro Val Thr Ile Asn Asn Phe Asn Arg Asn Asp Pro Ile Asp Asn  
1 5 10 15  
Asp Asn Ile Ile Met Met Glu Pro Pro Phe Ala Arg Gly Thr  
20 25 30

<210> 66  
<211> 50  
<212> PRT  
<213> Clostridium botulinum serotype B  
  
<220>  
<221> DOMAIN  
<222> (1)...(50)  
<223> Carboxyl terminal 50 amino acids of light chain  
  
<221> VARIANT  
<222> (30)...(30)  
<223> Lysine substitution

```

<400> 66
Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly Lys
 1           5           10           15
Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Lys Glu Glu
      20           25           30
Ile Ser Lys Glu His Leu Ala Val Tyr Lys Ile Gln Met Cys Lys Ser
      35           40           45
Val Lys
      50

```

```

<210> 67
<211> 30
<212> PRT
<213> Clostridium botulinum serotype C1

```

```

<220>
<221> DOMAIN
<222> (1)...(30)
<223> Amino terminal 30 amino acids of light chain

```

```

<221> VARIANT
<222> (8)...(8)
<223> Lysine substitution

```

```

<400> 67
Met Pro Ile Thr Ile Asn Asn Lys Asn Tyr Ser Asp Pro Val Asp Asn
 1           5           10           15
Lys Asn Ile Leu Tyr Leu Asp Thr His Leu Asn Thr Leu Ala
      20           25           30

```

```

<210> 68
<211> 50
<212> PRT
<213> Clostridium botulinum serotype C1

```

```

<220>
<221> DOMAIN
<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

```

```

<221> VARIANT
<222> (48)...(48)
<223> Arginine substitution

```

```

<400> 68
Asn Ile Pro Lys Ser Asn Leu Asn Val Leu Phe Met Gly Gln Asn Leu
 1           5           10           15
Ser Arg Asn Pro Ala Leu Arg Lys Val Asn Pro Glu Asn Met Leu Tyr
      20           25           30
Leu Phe Thr Lys Phe Cys His Lys Ala Ile Asp Gly Arg Ser Leu Arg
      35           40           45
Asn Lys
      50

```

<210> 69  
<211> 30  
<212> PRT  
<213> Clostridium botulinum serotype D

<220>  
<221> DOMAIN  
<222> (1)...(30)  
<223> Amino terminal 30 amino acids of light chain

<221> VARIANT  
<222> (5)...(5)  
<223> Alanine substitution

<221> VARIANT  
<222> (14)...(14)  
<223> Alanine substitution

<400> 69  
Met Thr Trp Pro Ala Lys Asp Phe Asn Tyr Ser Asp Pro Ala Asn Asp  
1 5 10 15  
Asn Asp Ile Leu Tyr Leu Arg Ile Pro Gln Asn Lys Leu Ile  
20 25 30

<210> 70  
<211> 50  
<212> PRT  
<213> Clostridium botulinum serotype D

<220>  
<221> DOMAIN  
<222> (1)...(50)  
<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT  
<222> (44)...(44)  
<223> Alanine substitution

<400> 70  
Tyr Thr Ile Arg Asp Gly Phe Asn Leu Thr Asn Lys Gly Phe Asn Ile  
1 5 10 15  
Glu Asn Ser Gly Gln Asn Ile Glu Arg Asn Pro Ala Leu Gln Lys Leu  
20 25 30  
Ser Ser Glu Ser Val Val Asp Leu Phe Thr Lys Ala Cys Leu Arg Leu  
35 40 45  
Thr Lys  
50

<210> 71  
<211> 30  
<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (13)...(13)

<223> Alanine substitution

<400> 71

Met	Pro	Lys	Ile	Asn	Ser	Phe	Asn	Tyr	Asn	Asp	Pro	Ala	Asn	Asp	Arg
1				5				10					15		
Thr	Ile	Leu	Tyr	Ile	Lys	Pro	Gly	Gly	Cys	Gln	Glu	Phe	Tyr		
			20					25					30		

<210> 72

<211> 50

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> DOMAIN

<222> (1)...(50)

<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT

<222> (31)...(31)

<223> Histidine substitution

<400> 72

Gly	Tyr	Asn	Ile	Asn	Asn	Leu	Lys	Val	Asn	Phe	Arg	Gly	Gln	Asn	Ala
1				5				10					15		
Asn	Leu	Asn	Pro	Arg	Ile	Ile	Thr	Pro	Ile	Thr	Gly	Arg	Gly	His	Val
			20					25				30			
Lys	Lys	Ile	Ile	Arg	Phe	Cys	Lys	Asn	Ile	Val	Ser	Val	Lys	Gly	Ile
		35					40					45			
Arg	Lys														
	50														

<210> 73

<211> 30

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (7)...(7)

<223> Arginine substitution

<400> 73

Met	Pro	Lys	Ile	Asn	Ser	Arg	Asn	Tyr	Asn	Asp	Pro	Val	Asn	Asp	Arg
1				5				10					15		
Thr	Ile	Leu	Tyr	Ile	Lys	Pro	Gly	Gly	Cys	Gln	Glu	Phe	Tyr		
			20				25						30		

<210> 74

<211> 50

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> DOMAIN

<222> (1)...(50)

<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT

<222> (42)...(42)

<223> Alanine substitution

<221> VARIANT

<222> (43)...(43)

<223> Alanine substitution

<400> 74

Gly	Tyr	Asn	Ile	Asn	Asn	Leu	Lys	Val	Asn	Phe	Arg	Gly	Gln	Asn	Ala
1				5				10					15		
Asn	Leu	Asn	Pro	Arg	Ile	Ile	Thr	Pro	Ile	Thr	Gly	Arg	Gly	Leu	Val
			20				25					30			
Lys	Lys	Ile	Ile	Arg	Phe	Cys	Lys	Asn	Ala	Ala	Ser	Val	Lys	Gly	Ile
		35				40					45				
Arg	Lys														
	50														

<210> 75

<211> 30

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (30)...(30)

<223> Arginine substitution

<400> 75

Met	Pro	Lys	Ile	Asn	Ser	Phe	Asn	Tyr	Asn	Asp	Pro	Val	Asn	Asp	Arg
1				5				10					15		

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Arg  
20 25 30

<210> 76  
<211> 50  
<212> PRT  
<213> Clostridium botulinum serotype E

<220>  
<221> DOMAIN  
<222> (1)...(50)  
<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT  
<222> (45)...(45)  
<223> Alanine substitution

<400> 76  
Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe Arg Gly Gln Asn Ala  
1 5 10 15  
Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr Gly Arg Gly Leu Val  
20 25 30  
Lys Lys Ile Ile Arg Phe Cys Lys Asn Ile Val Ser Ala Lys Gly Ile  
35 40 45  
Arg Lys  
50

<210> 77  
<211> 30  
<212> PRT  
<213> Clostridium botulinum serotype F

<220>  
<221> DOMAIN  
<222> (1)...(30)  
<223> Amino terminal 30 amino acids of light chain

<221> VARIANT  
<222> (3)...(3)  
<223> Alanine substitution

<400> 77  
Met Pro Ala Ala Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp  
1 5 10 15  
Asp Thr Ile Leu Tyr Met Gln Ile Pro Tyr Glu Glu Lys Ser  
20 25 30

<210> 78  
<211> 50  
<212> PRT  
<213> Clostridium botulinum serotype F

<220>  
<221> DOMAIN  
<222> (1)...(50)  
<223> Carboxyl terminal 50 amino acids of light chain  
  
<221> VARIANT  
<222> (46)...(46)  
<223> Alanine substitution  
  
<400> 78  
Thr Val Ser Glu Gly Phe Asn Ile Gly Asn Leu Ala Val Asn Asn Arg  
1 5 10 15  
Gly Gln Ser Ile Lys Leu Asn Pro Lys Ile Ile Asp Ser Ile Pro Asp  
20 25 30  
Lys Gly Leu Val Glu Lys Ile Val Lys Phe Cys Lys Ser Ala Ile Pro  
35 40 45  
Arg Lys  
50  
  
<210> 79  
<211> 30  
<212> PRT  
<213> Clostridium botulinum serotype G  
  
<220>  
<221> DOMAIN  
<222> (1)...(30)  
<223> Amino terminal 30 amino acids of light chain  
  
<221> VARIANT  
<222> (8)...(8)  
<223> Histidine substitution  
  
<400> 79  
Met Pro Val Asn Ile Lys Asn His Asn Tyr Asn Asp Pro Ile Asn Asn  
1 5 10 15  
Asp Asp Ile Ile Met Met Glu Pro Phe Asn Asp Pro Gly Pro  
20 25 30  
  
<210> 80  
<211> 50  
<212> PRT  
<213> Clostridium botulinum serotype G  
  
<220>  
<221> DOMAIN  
<222> (1)...(50)  
<223> Carboxyl terminal 50 amino acids of light chain  
  
<221> VARIANT  
<222> (47)...(47)  
<223> Alanine substitution

<400> 80  
Gln Asn Glu Gly Phe Asn Ile Ala Ser Lys Asn Leu Lys Thr Glu Phe  
1 5 10 15  
Asn Gly Gln Asn Lys Ala Val Asn Lys Glu Ala Tyr Glu Glu Ile Ser  
20 25 30  
Leu Glu His Leu Val Ile Tyr Arg Ile Ala Met Cys Lys Pro Ala Met  
35 40 45  
Tyr Lys  
50

<210> 81  
<211> 26  
<212> PRT  
<213> Clostridium botulinum serotype A

<220>  
<221> VARIANT  
<222> (1)...(26)  
<223> Variant of amino-terminal 30 amino acids of LC

<400> 81  
Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val Asn Gly  
1 5 10 15  
Val Asp Ile Ala Tyr Ile Lys Ile Pro His  
20 25

<210> 82  
<211> 43  
<212> PRT  
<213> Clostridium botulinum serotype A

<220>  
<221> VARIANT  
<222> (1)...(43)  
<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 82  
Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln  
1 5 10 15  
Asn Thr Glu Ile Asn Asn Met Asn Ala Ala Ala Ala Ala Ala Ala  
20 25 30  
Ala Ala Cys Val Arg Gly Ile Ile Thr Ser Lys  
35 40

<210> 83  
<211> 26  
<212> PRT  
<213> Clostridium botulinum serotype A

<220>  
<221> VARIANT  
<222> (1)...(26)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 83

Met	Ala	Ala	Ala	Asn	Tyr	Lys	Asp	Pro	Val	Asn	Gly	Val	Asp	Ile	Ala
1				5				10						15	
Tyr	Ile	Lys	Ile	Pro	Asn	Ala	Gly	Gln	Met						
			20				25								

<210> 84

<211> 48

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(48)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 84

Gly	Lys	Asn	Leu	Arg	Asn	Thr	Asn	Leu	Ala	Ala	Asn	Phe	Asn	Gly	Gln
1				5				10						15	
Asn	Thr	Glu	Ile	Asn	Asn	Met	Asn	Phe	Thr	Lys	Leu	Lys	Asn	Phe	Thr
			20				25					30			
Gly	Leu	Phe	Glu	Phe	Tyr	Lys	Cys	Val	Arg	Gly	Ile	Ile	Thr	Ser	Lys
		35					40					45			

<210> 85

<211> 26

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(26)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 85

Met	Pro	Phe	Val	Asn	Lys	Gln	Phe	Asn	Tyr	Lys	Asp	Pro	Val	Asn	Gly
1				5				10						15	
Val	Asp	Ile	Ala	Arg	Asn	Ala	Gly	Gln	Met						
			20				25								

<210> 86

<211> 46

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(46)

<223> Variant of carboxyl-terminal 50 amino acids of LC

&lt;400&gt; 86

Gly	Phe	Asn	Leu	Arg	Asn	Thr	Asn	Leu	Ala	Ala	His	Asn	Thr	Glu	Ile
1				5					10					15	
Asn	Asn	Met	Asn	Phe	Thr	Lys	Leu	Lys	Asn	Phe	Thr	Gly	Leu	Phe	Glu
			20					25					30		
Phe	Tyr	Lys	Leu	Leu	Cys	Val	Arg	Gly	Ile	Ile	Thr	Ser	Lys		
		35					40					45			

&lt;210&gt; 87

&lt;211&gt; 26

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype A

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(26)

&lt;223&gt; Variant of amino-terminal 30 amino acids of LC

&lt;400&gt; 87

Met	Pro	Lys	Val	Asn	Lys	Gln	Phe	Asn	Val	Asn	Gly	Val	Asp	Ile	Ala
1				5					10					15	
Tyr	Ile	Lys	Ile	Pro	Asn	Ala	Gly	Gln	Met						
			20				25								

&lt;210&gt; 88

&lt;211&gt; 42

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype A

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(42)

&lt;223&gt; Variant of carboxyl-terminal 50 amino acids of LC

&lt;400&gt; 88

Gly	Phe	Asn	Leu	Arg	Asn	Thr	Asn	Leu	Ala	Ala	Asn	Phe	Asn	Gly	Gln
1				5					10					15	
Asn	Thr	Glu	Ile	Asn	Asn	Met	Asn	Phe	Thr	Lys	Leu	Lys	Asn	Phe	Thr
			20				25					30			
Gly	Leu	Phe	Glu	Phe	Arg	Arg	Thr	Ser	Lys						
		35					40								

&lt;210&gt; 89

&lt;211&gt; 30

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype B

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(30)

&lt;223&gt; Variant of amino-terminal 30 amino acids of LC

&lt;400&gt; 89

Met Pro Val Thr Ile Asn Asn Phe Asn Tyr Asn Asp Pro Ile Asp Asn  
1 5 10 15  
Asp Asn Ile Ile Ala Ala Ala Ala Ala Arg Gly Thr  
20 25 30

&lt;210&gt; 90

&lt;211&gt; 37

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype B

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(37)

&lt;223&gt; Variant of carboxyl-terminal 50 amino acids of LC

&lt;400&gt; 90

Tyr Thr Ile Pro Pro Gly Phe Asn Ile Ser Asp Lys Asn Met Gly Lys  
1 5 10 15  
Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Tyr Glu Glu  
20 25 30  
Ile Ser Lys Glu His  
35

&lt;210&gt; 91

&lt;211&gt; 26

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype B

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(26)

&lt;223&gt; Variant of amino-terminal 30 amino acids of LC

&lt;400&gt; 91

Met Pro Ala Phe Asn Tyr Asn Asp Pro Ile Asp Asn Asp Asn Ile Ile  
1 5 10 15  
Met Met Glu Pro Pro Phe Ala Arg Gly Thr  
20 25

&lt;210&gt; 92

&lt;211&gt; 50

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype B

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(50)

&lt;223&gt; Variant of carboxyl-terminal 50 amino acids of LC

&lt;400&gt; 92

Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly Lys

```

      1           5           10           15
Glu Tyr Arg Gly Gln Asn Lys Ala Ala Ala Ala Ala Glu Glu
      20           25           30
Ile Ser Lys Glu His Leu Ala Val Tyr Lys Ile Gln Met Cys Lys Ser
      35           40           45
Val Lys
      50

```

```

<210> 93
<211> 20
<212> PRT
<213> Clostridium botulinum serotype B

```

```

<220>
<221> VARIANT
<222> (1)...(20)
<223> Variant of amino-terminal 30 amino acids of LC

```

```

<400> 93
Met Pro Val Thr Ile Asn Asn Phe Asn Arg Met Met Glu Pro Pro Phe
      1           5           10           15
Ala Arg Gly Thr
      20

```

```

<210> 94
<211> 44
<212> PRT
<213> Clostridium botulinum serotype B

```

```

<220>
<221> VARIANT
<222> (1)...(44)
<223> Variant of carboxyl-terminal 50 amino acids of LC

```

```

<400> 94
Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly Lys
      1           5           10           15
Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Tyr Ala Ala
      20           25           30
Ala Ala Ala Ala Ile Gln Met Cys Lys Ser Val Lys
      35           40

```

```

<210> 95
<211> 21
<212> PRT
<213> Clostridium botulinum serotype C1

```

```

<220>
<221> VARIANT
<222> (1)...(21)
<223> Variant of amino-terminal 30 amino acids of LC

```

&lt;400&gt; 95

Met Ser Asp Pro Val Asp Asn Lys Asn Ile Leu Tyr Leu Asp Thr His  
1 5 10 15  
Leu Asn Thr Leu Ala  
20

&lt;210&gt; 96

&lt;211&gt; 47

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype C1

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(47)

&lt;223&gt; Variant of carboxyl-terminal 50 amino acids of LC

&lt;400&gt; 96

Asn Ile Pro Lys Ser Asn Leu Asn Val Leu Phe Met Gly Gln Asn Leu  
1 5 10 15  
Ser Arg Asn Pro Ala Leu Arg Lys Val Asn Pro Glu Asn Met Leu Ala  
20 25 30  
Ala Ala Cys His Lys Ala Ile Asp Gly Arg Ser Leu Tyr Asn Lys  
35 40 45

&lt;210&gt; 97

&lt;211&gt; 26

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype D

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(26)

&lt;223&gt; Variant of amino-terminal 30 amino acids of LC

&lt;400&gt; 97

Met Thr Arg Pro Val Lys Asp Asp Pro Val Asn Asp Asn Asp Ile Leu  
1 5 10 15  
Tyr Leu Arg Ile Pro Gln Asn Lys Leu Ile  
20 25

&lt;210&gt; 98

&lt;211&gt; 44

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype D

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(44)

&lt;223&gt; Variant of carboxyl-terminal 50 amino acids of LC

&lt;400&gt; 98

Tyr Thr Ile Arg Asp Gly Phe Asn Leu Thr Asn Lys Gly Phe Asn Ile

```

      1           5           10           15
Glu Asn Ser Gly Gln Asn Ile Glu Arg Asn Pro Ala Leu Gln Lys Leu
      20           25           30
Asp Leu Pro Pro Lys Val Cys Leu Arg Leu Thr Lys
      35           40

```

```

<210> 99
<211> 31
<212> PRT
<213> Clostridium botulinum serotype E

<220>
<221> VARIANT
<222> (1)...(31)
<223> Variant of amino-terminal 30 amino acids of LC

```

```

<400> 99
Met Pro Lys Ile Asn Ser Pro Pro Asn Tyr Asn Asp Pro Val Asn Asp
      1           5           10           15
Arg Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr
      20           25           30

```

```

<210> 100
<211> 50
<212> PRT
<213> Clostridium botulinum serotype E

<220>
<221> VARIANT
<222> (1)...(50)
<223> Variant of carboxyl-terminal 50 amino acids of LC

```

```

<400> 100
Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe Arg Gly Gln Asn Ala
      1           5           10           15
Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr Gly Arg Gly Leu Val
      20           25           30
Lys Lys Ala Ala Ala Cys Lys Asn Ile Val Ser Val Lys Gly Ile
      35           40           45
Arg Lys
      50

```

```

<210> 101
<211> 33
<212> PRT
<213> Clostridium botulinum serotype E

<220>
<221> VARIANT
<222> (1)...(33)
<223> Variant of amino-terminal 30 amino acids of LC

```

&lt;400&gt; 101

```

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Ala Ala Ala Ala
 1           5           10           15
Asn Asp Arg Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe
          20           25           30

```

Tyr

&lt;210&gt; 102

&lt;211&gt; 47

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype E

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(47)

&lt;223&gt; Variant of carboxyl-terminal 50 amino acids of LC

&lt;400&gt; 102

```

Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe Arg Gly Gln Asn Ala
 1           5           10           15
Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr Gly Arg Gly Leu Val
          20           25           30
His Arg Phe Cys Lys Asn Ile Val Ser Val Lys Gly Ile Arg Lys
          35           40           45

```

&lt;210&gt; 103

&lt;211&gt; 30

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype E

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(30)

&lt;223&gt; Variant of amino-terminal 30 amino acids of LC

&lt;400&gt; 103

```

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
 1           5           10           15
Thr Ile Leu Lys Ile Lys Pro Gly Gly Cys Lys Glu Phe Tyr
          20           25           30

```

&lt;210&gt; 104

&lt;211&gt; 33

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype E

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(33)

&lt;223&gt; Variant of carboxyl-terminal 50 amino acids of LC

&lt;400&gt; 104

Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe Arg Gly Gln Asn Ala

1

5

10

15

Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr Gly Arg Gly Leu Pro

20

25

30

Pro

&lt;210&gt; 105

&lt;211&gt; 24

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype F

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(24)

&lt;223&gt; Variant of amino-terminal 30 amino acids of LC

&lt;400&gt; 105

Met Pro Asn Tyr Asn Asp Pro Val Asn Asp Asp Thr Ile Leu Tyr Met

1

5

10

15

Gln Ile Pro Tyr Glu Glu Lys Ser

20

&lt;210&gt; 106

&lt;211&gt; 48

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype F

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(48)

&lt;223&gt; Variant of carboxyl-terminal 50 amino acids of LC

&lt;400&gt; 106

Thr Val Ser Glu Gly Phe Asn Ile Gly Asn Leu Ala Val Asn Asn Arg

1

5

10

15

Gly Gln Ser Ile Lys Leu Asn Pro Lys Ile Ile Asp Ser Ile Pro Asp

20

25

30

Lys Gly Ala Ala Ala Ala Ala Ala Cys Lys Ser Val Ile Pro Arg Lys

35

40

45

&lt;210&gt; 107

&lt;211&gt; 26

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype G

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(26)

&lt;223&gt; Variant of amino-terminal 30 amino acids of LC

&lt;400&gt; 107

Met	Pro	Val	Asn	Ile	Pro	Pro	Asp	Pro	Ile	Asn	Asn	Asp	Asp	Ile	Ile
1				5					10					15	
Met	Met	Glu	Pro	Phe	Asn	Asp	Pro	Gly	Pro						
			20					25							

&lt;210&gt; 108

&lt;211&gt; 35

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype G

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(35)

&lt;223&gt; Variant of carboxyl-terminal 50 amino acids of LC

&lt;400&gt; 108

Gln	Asn	Glu	Gly	Phe	Asn	Ile	Ala	Ser	Lys	Asn	Leu	Lys	Thr	Glu	Phe
1				5				10					15		
Asn	Gly	Gln	Asn	Lys	Ala	Val	Asn	Lys	Glu	Ala	Tyr	Ala	Ala	Ala	Ala
			20					25				30			
Ala	Ala	Ala													
			35												

&lt;210&gt; 109

&lt;211&gt; 22

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype A

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(22)

&lt;223&gt; Variant of amino-terminal 30 amino acids of LC

&lt;400&gt; 109

Met	Tyr	Lys	Asp	Pro	Val	Asn	Gly	Val	Asp	Ile	Ala	Tyr	Ile	Lys	Ile
1				5					10				15		
Pro	Asn	Ala	Gly	Gln	Met										
			20												

&lt;210&gt; 110

&lt;211&gt; 39

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype A

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(39)

&lt;223&gt; Variant of carboxyl-terminal 50 amino acids of LC

&lt;400&gt; 110

Gly	Phe	Asn	Leu	Arg	Asn	Thr	Asn	Leu	Ala	Ala	Asn	Phe	Asn	Gly	Gln
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

```

      1           5           10           15
Asn Thr Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys Asn Phe Thr
      20           25           30
Gly Leu Phe Glu Phe Tyr Lys
      35

```

&lt;210&gt; 111

&lt;211&gt; 24

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype A

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(24)

&lt;223&gt; Variant of amino-terminal 30 amino acids of LC

&lt;400&gt; 111

```

Met Pro Phe Val Asn Lys Gln Val Asn Gly Val Asp Ile Ala Tyr Ile
      1           5           10           15
Lys Ile Pro Asn Ala Gly Gln Met
      20

```

&lt;210&gt; 112

&lt;211&gt; 40

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype A

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(40)

&lt;223&gt; Variant of carboxyl-terminal 50 amino acids of LC

&lt;400&gt; 112

```

Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln
      1           5           10           15
Asn Thr Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys Leu Leu Cys
      20           25           30
Val Arg Gly Ile Ile Thr Ser Lys
      35           40

```

&lt;210&gt; 113

&lt;211&gt; 24

&lt;212&gt; PRT

&lt;213&gt; Clostridium botulinum serotype A

&lt;220&gt;

&lt;221&gt; VARIANT

&lt;222&gt; (1)...(24)

&lt;223&gt; Variant of amino-terminal 30 amino acids of LC

&lt;400&gt; 113

```

Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Ala Tyr Ile

```

<213> Clostridium botulinum serotype A

<223> Variant of carboxyl-terminal 50 amino acids of LC

Asn Thr Glu Ile Asn Asn Met Asn Gly Leu Phe Glu Phe Tyr Lys Leu  
20 25 30  
Leu Cys Val Arg Gly Ile Ile Thr Ser Lys  
35 40

<213> Clostridium botulinum serotype A

<223> Variant of amino-terminal 30 amino acids of LC

Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val Asn Gly  
1 5 10 15  
Val Asp Ile Ala  
20

<213> Clostridium botulinum serotype A

<223> Variant of carboxyl-terminal 50 amino acids of LC

Gly Phe Asn Leu Arg Asn Asn Thr Glu Ile Asn Asn Met Asn Phe Thr  
1 5 10 15

Lys Leu Lys Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys  
20 25 30  
Val Arg Gly Ile Ile Thr Ser Lys  
35 40

<210> 117  
<211> 23  
<212> PRT  
<213> Clostridium botulinum serotype B

<220>  
<221> VARIANT  
<222> (1)...(23)  
<223> Variant of amino-terminal 30 amino acids of LC

<400> 117  
Met Pro Val Thr Ile Asn Asn Phe Asn Tyr Asn Asp Pro Ile Asp Asn  
1 5 10 15  
Asp Asn Ile Ile Met Met Glu  
20

<210> 118  
<211> 45  
<212> PRT  
<213> Clostridium botulinum serotype B

<220>  
<221> VARIANT  
<222> (1)...(45)  
<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 118  
Tyr Thr Ile Ile Ser Asp Lys Asn Met Gly Lys Glu Tyr Arg Gly Gln  
1 5 10 15  
Asn Lys Ala Ile Asn Lys Gln Ala Tyr Glu Glu Ile Ser Lys Glu His  
20 25 30  
Leu Ala Val Tyr Lys Ile Gln Met Cys Lys Ser Val Lys  
35 40 45

<210> 119  
<211> 20  
<212> PRT  
<213> Clostridium botulinum serotype B

<220>  
<221> VARIANT  
<222> (1)...(20)  
<223> Variant of amino-terminal 30 amino acids of LC

<400> 119  
Met Pro Val Thr Ile Asn Asn Phe Asn Tyr Asn Asp Glu Pro Pro Phe  
1 5 10 15

Ala Arg Gly Thr  
20

<210> 120  
<211> 42  
<212> PRT  
<213> Clostridium botulinum serotype B

<220>  
<221> VARIANT  
<222> (1)...(42)  
<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 120  
Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Gly Gln Asn Lys Ala  
1 5 10 15  
Ile Asn Lys Gln Ala Tyr Glu Glu Ile Ser Lys Glu His Leu Ala Val  
20 25 30  
Tyr Lys Ile Gln Met Cys Lys Ser Val Lys  
35 40

<210> 121  
<211> 22  
<212> PRT  
<213> Clostridium botulinum serotype B

<220>  
<221> VARIANT  
<222> (1)...(22)  
<223> Variant of amino-terminal 30 amino acids of LC

<400> 121  
Met Pro Asn Asp Pro Ile Asp Asn Asp Asn Ile Ile Met Met Glu Pro  
1 5 10 15  
Pro Phe Ala Arg Gly Thr  
20

<210> 122  
<211> 38  
<212> PRT  
<213> Clostridium botulinum serotype B

<220>  
<221> VARIANT  
<222> (1)...(38)  
<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 122  
Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly Lys  
1 5 10 15  
Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Lys Ile Gln  
20 25 30

Met Cys Lys Ser Val Lys  
35

<210> 123  
<211> 23  
<212> PRT  
<213> Clostridium botulinum serotype C1

<220>  
<221> VARIANT  
<222> (1)...(23)  
<223> Variant of amino-terminal 30 amino acids of LC

<400> 123  
Met Pro Ile Ser Asp Pro Val Asp Asn Lys Asn Ile Leu Tyr Leu Asp  
1 5 10 15  
Thr His Leu Asn Thr Leu Ala  
20

<210> 124  
<211> 40  
<212> PRT  
<213> Clostridium botulinum serotype C1

<220>  
<221> VARIANT  
<222> (1)...(40)  
<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 124  
Asn Ile Pro Lys Ser Asn Leu Asn Val Leu Phe Met Gly Gln Asn Leu  
1 5 10 15  
Ser Arg Asn Pro Ala Leu Arg Lys Val Lys Phe Cys His Lys Ala Ile  
20 25 30  
Asp Gly Arg Ser Leu Tyr Asn Lys  
35 40

<210> 125  
<211> 20  
<212> PRT  
<213> Clostridium botulinum serotype D

<220>  
<221> VARIANT  
<222> (1)...(20)  
<223>  
Variant of amino-terminal 30 amino acids of LC

<400> 125  
Met Thr Trp Val Asn Asp Asn Asp Ile Leu Tyr Leu Arg Ile Pro Gln  
1 5 10 15  
Asn Lys Leu Ile

20

<210> 126  
<211> 40  
<212> PRT  
<213> Clostridium botulinum serotype D

<220>  
<221> VARIANT  
<222> (1)...(40)  
<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 126  
Tyr Thr Ile Arg Asp Gly Phe Asn Leu Thr Asn Lys Gly Phe Asn Ile  
1 5 10 15  
Glu Asn Ser Gly Gln Asn Ile Glu Arg Asn Pro Ala Asp Leu Phe Thr  
20 25 30  
Lys Val Cys Leu Arg Leu Thr Lys  
35 40

<210> 127  
<211> 22  
<212> PRT  
<213> Clostridium botulinum serotype E

<220>  
<221> VARIANT  
<222> (1)...(22)  
<223> Variant of amino-terminal 30 amino acids of LC

<400> 127  
Met Pro Asp Pro Val Asn Asp Arg Thr Ile Leu Tyr Ile Lys Pro Gly  
1 5 10 15  
Gly Cys Gln Glu Phe Tyr  
20

<210> 128  
<211> 40  
<212> PRT  
<213> Clostridium botulinum serotype E

<220>  
<221> VARIANT  
<222> (1)...(40)  
<223>  
Variant of carboxyl-terminal 50 amino acids of LC

<400> 128  
Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe Arg Gly Gln Asn Ala  
1 5 10 15  
Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Arg Phe Cys Lys Asn Ile  
20 25 30

Val Ser Val Lys Gly Ile Arg Lys  
35 40

<210> 129  
<211> 20  
<212> PRT  
<213> Clostridium botulinum serotype E

<220>  
<221> VARIANT  
<222> (1)...(20)  
<223> Variant of amino-terminal 30 amino acids of LC

<400> 129  
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Ile Lys Pro Gly Gly Cys  
1 5 10 15  
Gln Glu Phe Tyr  
20

<210> 130  
<211> 44  
<212> PRT  
<213> Clostridium botulinum serotype E

<220>  
<221> VARIANT  
<222> (1)...(44)  
<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 130  
Gly Tyr Asn Ile Asn Asn Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile  
1 5 10 15  
Ile Thr Pro Ile Thr Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe  
20 25 30  
Cys Lys Asn Ile Val Ser Val Lys Gly Ile Arg Lys  
35 40

<210> 131  
<211> 22  
<212> PRT  
<213> Clostridium botulinum serotype E

<220>  
<221> VARIANT  
<222> (1)...(22)  
<223> Variant of amino-terminal 30 amino acids of LC

<400> 131  
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg  
1 5 10 15  
Thr Ile Leu Tyr Ile Lys  
20

<210> 132  
<211> 42  
<212> PRT  
<213> Clostridium botulinum serotype E  
  
<220>  
<221> VARIANT  
<222> (1)...(42)  
<223> Variant of carboxyl-terminal 50 amino acids of LC  
  
<400> 132  
Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe Arg Gly Gln Asn Ala  
1 5 10 15  
Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr Gly Arg Gly Leu Val  
20 25 30  
Lys Lys Ile Ile Arg Lys Gly Ile Arg Lys  
35 40

<210> 133  
<211> 25  
<212> PRT  
<213> Clostridium botulinum serotype F  
  
<220>  
<221> VARIANT  
<222> (1)...(25)  
<223> Variant of amino-terminal 30 amino acids of LC  
  
<400> 133  
Met Pro Val Ala Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp  
1 5 10 15  
Asp Thr Ile Leu Tyr Met Gln Ile Pro  
20 25

<210> 134  
<211> 42  
<212> PRT  
<213> Clostridium botulinum serotype F  
  
<220>  
<221> VARIANT  
<222> (1)...(42)  
<223> Variant of carboxyl-terminal 50 amino acids of LC  
  
<400> 134  
Thr Val Ser Glu Gly Phe Asn Ile Gly Asn Leu Ala Val Asn Asn Arg  
1 5 10 15  
Gly Gln Ser Ile Lys Leu Asn Pro Lys Ile Ile Asp Ser Ile Pro Asp  
20 25 30  
Lys Phe Cys Lys Ser Val Ile Pro Arg Lys  
35 40

<210> 135  
 <211> 38  
 <212> PRT  
 <213> Clostridium botulinum serotype G  
  
 <220>  
 <221> VARIANT  
 <222> (1)...(38)  
 <223> Variant of carboxyl-terminal 50 amino acids of LC  
  
 <400> 135  
 Gln Asn Glu Gly Phe Asn Ile Ala Ser Lys Asn Leu Lys Thr Glu Phe  
 1 5 10 15  
 Asn Gly Gln Asn Lys Ala Val Asn Lys Glu Ala Arg Ile Ala Met Cys  
 20 25 30  
 Lys Pro Val Met Tyr Lys  
 35  
  
 <210> 136  
 <211> 423  
 <212> PRT  
 <213> Artificial Sequence  
  
 <220>  
 <221> DOMAIN  
 <222> (1)...(423)  
 <223> BoNT/A-BoNT/E chimeric LC  
  
 <400> 136  
 Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg  
 1 5 10 15  
 Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser  
 20 25 30  
 Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile  
 35 40 45  
 Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly  
 50 55 60  
 Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys  
 65 70 75 80  
 Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn  
 85 90 95  
 Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro  
 100 105 110  
 Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp  
 115 120 125  
 Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu  
 130 135 140  
 Leu Pro Asn Val Ile Ile Met Gly Ala Glu Pro Asp Leu Phe Glu Thr  
 145 150 155 160  
 Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His  
 165 170 175  
 Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe

Arg	Phe	Asn	Asp	Asn	Ser	Met	Asn	Glu	Phe	Ile	Gln	Asp	Pro	Ala	Leu	180	185	190
Thr	Leu	Met	His	Glu	Leu	Ile	His	Ser	Leu	His	Gly	Leu	Tyr	Gly	Ala	195	200	205
Lys	Gly	Ile	Thr	Thr	Lys	Tyr	Thr	Ile	Thr	Gln	Lys	Gln	Asn	Pro	Leu	210	215	220
Ile	Thr	Asn	Ile	Arg	Gly	Thr	Asn	Ile	Glu	Glu	Phe	Leu	Thr	Phe	Gly	225	230	235
Gly	Thr	Asp	Leu	Asn	Ile	Ile	Thr	Ser	Ala	Gln	Ser	Asn	Asp	Ile	Tyr	240	245	250
Thr	Asn	Leu	Leu	Ala	Asp	Tyr	Lys	Lys	Ile	Ala	Ser	Lys	Leu	Ser	Lys	255	260	265
Val	Gln	Val	Ser	Asn	Pro	Leu	Leu	Asn	Pro	Tyr	Lys	Asp	Val	Phe	Glu	270	275	280
Ala	Lys	Tyr	Gly	Leu	Asp	Lys	Asp	Ala	Ser	Gly	Ile	Tyr	Ser	Val	Asn	285	290	295
Ile	Asn	Lys	Phe	Asn	Asp	Ile	Phe	Lys	Lys	Leu	Tyr	Ser	Phe	Thr	Glu	300	305	310
Phe	Asp	Leu	Ala	Thr	Lys	Phe	Gln	Val	Lys	Cys	Arg	Gln	Thr	Tyr	Ile	315	320	325
Gly	Gln	Tyr	Lys	Tyr	Phe	Lys	Leu	Ser	Asn	Leu	Leu	Asn	Asp	Ser	Ile	330	335	340
Tyr	Asn	Ile	Ser	Glu	Gly	Tyr	Asn	Ile	Asn	Asn	Leu	Lys	Val	Asn	Phe	345	350	355
Arg	Gly	Gln	Asn	Ala	Asn	Leu	Asn	Pro	Arg	Ile	Ile	Thr	Pro	Ile	Thr	360	365	370
Gly	Lys	Asn	Phe	Thr	Gly	Leu	Phe	Glu	Phe	Tyr	Lys	Leu	Leu	Cys	Val	375	380	385
Arg	Gly	Ile	Ile	Thr	Ser	Lys										390	395	400
																405	410	415
																420		

&lt;210&gt; 137

&lt;211&gt; 441

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(441)

&lt;223&gt; BoNT/A-BoNT/B chimeric LC

&lt;400&gt; 137

Met	Pro	Phe	Val	Asn	Lys	Gln	Phe	Asn	Tyr	Lys	Asp	Pro	Val	Asn	Gly	1	5	10	15
Val	Asp	Ile	Ala	Tyr	Ile	Lys	Ile	Pro	Asn	Ala	Gly	Gln	Met	Gly	Arg	20	25	30	35
Tyr	Tyr	Lys	Ala	Phe	Lys	Ile	Thr	Asp	Arg	Ile	Trp	Ile	Ile	Pro	Glu	40	45	50	55
Arg	Tyr	Thr	Phe	Gly	Tyr	Lys	Pro	Glu	Asp	Phe	Asn	Lys	Ser	Ser	Gly	60	65	70	75
Ile	Phe	Asn	Arg	Asp	Val	Cys	Glu	Tyr	Tyr	Asp	Pro	Asp	Tyr	Leu	Asn	80	85	90	95
Thr	Asn	Asp	Lys	Lys	Asn	Ile	Phe	Phe	Gln	Thr	Leu	Ile	Lys	Leu	Phe	100	105	110	115

$\langle 222 \rangle$  (1) ... (423)

&lt;223&gt; BoNT/A-BoNT/E chimeric LC

&lt;400&gt; 138

```

Met Pro Phe Val Asn Lys Gln Phe Asn Asn Asp Pro Val Asn Asp Arg
 1          5          10          15
Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
 20          25          30
Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
 35          40          45
Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
 50          55          60
Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
 65          70          75
Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
 85          90          95
Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
100          105          110
Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
115          120          125
Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
130          135          140
Leu Pro Asn Val Ile Ile Met Gly Ala Glu Pro Asp Leu Phe Glu Thr
145          150          155
Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
165          170          175
Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
180          185          190
Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
195          200          205
Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
210          215          220
Lys Gly Ile Thr Thr Lys Tyr Thr Ile Thr Gln Lys Gln Asn Pro Leu
225          230          235
Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
245          250          255
Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
260          265          270
Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
275          280          285
Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
290          295          300
Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305          310          315
Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
325          330          335
Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
340          345          350
Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
355          360          365
Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe
370          375          380
Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Thr Pro Ile Thr
385          390          395
Gly Lys Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val
405          410          415

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Arg Gly Ile Ile Thr Ser Lys  
420

<210> 139

<211> 441

<212> PRT

<213> Artificial Sequence

<220>

<221> DOMAIN

<222> (1)...(441)

<223> BoNT/A-BoNT/B chimeric LC

<400> 139

```

Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Asn Asp Pro Ile Asp Asn
 1          5          10          15
Asp Asn Ile Ile Met Met Glu Pro Pro Phe Ala Arg Gly Thr Gly Arg
 20          25          30
Tyr Tyr Lys Ala Phe Lys Ile Thr Asp Arg Ile Trp Ile Ile Pro Glu
 35          40          45
Arg Tyr Thr Phe Gly Tyr Lys Pro Glu Asp Phe Asn Lys Ser Ser Gly
 50          55          60
Ile Phe Asn Arg Asp Val Cys Glu Tyr Tyr Asp Pro Asp Tyr Leu Asn
 65          70          75          80
Thr Asn Asp Lys Lys Asn Ile Phe Phe Gln Thr Leu Ile Lys Leu Phe
 85          90          95
Asn Arg Ile Lys Ser Lys Pro Leu Gly Glu Lys Leu Leu Glu Met Ile
100          105          110
Ile Asn Gly Ile Pro Tyr Leu Gly Asp Arg Arg Val Pro Leu Glu Glu
115          120          125
Phe Asn Thr Asn Ile Ala Ser Val Thr Val Asn Lys Leu Ile Ser Asn
130          135          140
Pro Gly Glu Val Glu Arg Lys Lys Gly Ile Phe Ala Asn Leu Ile Ile
145          150          155          160
Phe Gly Pro Gly Pro Val Leu Asn Glu Asn Glu Thr Ile Asp Ile Gly
165          170          175
Ile Gln Asn His Phe Ala Ser Arg Glu Gly Phe Gly Gly Ile Met Gln
180          185          190
Met Lys Phe Cys Pro Glu Tyr Val Ser Val Phe Asn Asn Val Gln Glu
195          200          205
Asn Lys Gly Ala Ser Ile Phe Asn Arg Arg Gly Tyr Phe Ser Asp Pro
210          215          220
Ala Leu Ile Leu Met His Glu Leu Ile His Val Leu His Gly Leu Tyr
225          230          235          240
Gly Ile Lys Val Asp Asp Leu Pro Ile Val Pro Asn Glu Lys Lys Phe
245          250          255
Phe Met Gln Ser Thr Asp Thr Ile Gln Ala Glu Glu Leu Tyr Thr Phe
260          265          270
Gly Gly Gln Asp Pro Ser Ile Ile Ser Pro Ser Thr Asp Lys Ser Ile
275          280          285
Tyr Asp Lys Val Leu Gln Asn Phe Arg Gly Ile Val Asp Arg Leu Asn
290          295          300
Lys Val Leu Val Cys Ile Ser Asp Pro Asn Ile Asn Ile Asn Ile Tyr
305          310          315          320

```

Lys Asn Lys Phe Lys Asp Lys Tyr Lys Phe Val Glu Asp Ser Glu Gly  
 325 330 335  
 Lys Tyr Ser Ile Asp Val Glu Ser Phe Asn Lys Leu Tyr Lys Ser Leu  
 340 345 350  
 Met Leu Gly Phe Thr Glu Ile Asn Ile Ala Glu Asn Tyr Lys Ile Lys  
 355 360 365  
 Thr Arg Ala Ser Tyr Phe Ser Asp Ser Leu Pro Pro Val Lys Ile Lys  
 370 375 380  
 Asn Leu Leu Asp Asn Glu Ile Tyr Thr Ile Glu Glu Gly Phe Asn Ile  
 385 390 395 400  
 Ser Asp Lys Asn Met Gly Lys Glu Tyr Arg Gly Gln Asn Lys Ala Ile  
 405 410 415  
 Asn Lys Gln Lys Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu  
 420 425 430  
 Cys Val Arg Gly Ile Ile Thr Ser Lys  
 435 440

&lt;210&gt; 140

&lt;211&gt; 436

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(436)

&lt;223&gt; BoNT/A-BoNT/F chimeric LC

&lt;400&gt; 140

Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Asn Asp Pro Val Asn Asp  
 1 5 10 15  
 Asp Thr Ile Leu Tyr Met Gln Ile Pro Tyr Glu Glu Lys Ser Lys Lys  
 20 25 30  
 Tyr Tyr Lys Ala Phe Glu Ile Met Arg Asn Val Trp Ile Ile Pro Glu  
 35 40 45  
 Arg Asn Thr Ile Gly Thr Asn Pro Ser Asp Phe Asp Pro Pro Ala Ser  
 50 55 60  
 Leu Lys Asn Gly Ser Ser Ala Tyr Tyr Asp Pro Asn Tyr Leu Thr Thr  
 65 70 75 80  
 Asp Ala Glu Lys Asp Arg Tyr Leu Lys Thr Thr Ile Lys Leu Phe Lys  
 85 90 95  
 Arg Ile Asn Ser Asn Pro Ala Gly Lys Val Leu Leu Gln Glu Ile Ser  
 100 105 110  
 Tyr Ala Lys Pro Tyr Leu Gly Asn Asp His Thr Pro Ile Asp Glu Phe  
 115 120 125  
 Ser Pro Val Thr Arg Thr Thr Ser Val Asn Ile Lys Leu Ser Thr Asn  
 130 135 140  
 Val Glu Ser Ser Met Leu Leu Asn Leu Leu Val Leu Gly Ala Gly Pro  
 145 150 155 160  
 Asp Ile Phe Glu Ser Cys Cys Tyr Pro Val Arg Lys Leu Ile Asp Pro  
 165 170 175  
 Asp Val Val Tyr Asp Pro Ser Asn Tyr Gly Phe Gly Ser Ile Asn Ile  
 180 185 190  
 Val Thr Phe Ser Pro Glu Tyr Glu Tyr Thr Phe Asn Asp Ile Ser Gly  
 195 200 205

Gly His Asn Ser Ser Thr Glu Ser Phe Ile Ala Asp Pro Ala Ile Ser  
 210 215 220  
 Leu Ala His Glu Leu Ile His Ala Leu His Gly Leu Tyr Gly Ala Arg  
 225 230 235 240  
 Gly Val Thr Tyr Glu Glu Thr Ile Glu Val Lys Gln Ala Pro Leu Met  
 245 250 255  
 Ile Ala Glu Lys Pro Ile Arg Leu Glu Glu Phe Leu Thr Phe Gly Gly  
 260 265 270  
 Gln Asp Leu Asn Ile Ile Thr Ser Ala Met Lys Glu Lys Ile Tyr Asn  
 275 280 285  
 Asn Leu Leu Ala Asn Tyr Glu Lys Ile Ala Thr Arg Leu Ser Glu Val  
 290 295 300  
 Asn Ser Ala Pro Pro Glu Tyr Asp Ile Asn Glu Tyr Lys Asp Tyr Phe  
 305 310 315 320  
 Gln Trp Lys Tyr Gly Leu Asp Lys Asn Ala Asp Gly Ser Tyr Thr Val  
 325 330 335  
 Asn Glu Asn Lys Phe Asn Glu Ile Tyr Lys Lys Leu Tyr Ser Phe Thr  
 340 345 350  
 Glu Ser Asp Leu Ala Asn Lys Phe Lys Val Lys Cys Arg Asn Thr Tyr  
 355 360 365  
 Phe Ile Lys Tyr Glu Phe Leu Lys Val Pro Asn Leu Leu Asp Asp Asp  
 370 375 380  
 Ile Tyr Thr Val Ser Glu Gly Phe Asn Ile Gly Asn Leu Ala Val Asn  
 385 390 395 400  
 Asn Arg Gly Gln Ser Ile Lys Leu Asn Pro Lys Ile Ile Asp Lys Asn  
 405 410 415  
 Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly Ile  
 420 425 430  
 Ile Thr Ser Lys  
 435

&lt;210&gt; 141

&lt;211&gt; 483

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(483)

&lt;223&gt; BoNT/A-BoNT/B chimeric LC

&lt;400&gt; 141

Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val Asn Gly  
 1 5 10 15  
 Val Asp Ile Ala Tyr Ile Lys Ile Pro Asn Ala Gly Gln Met Gln Pro  
 20 25 30  
 Val Lys Ala Phe Lys Ile His Asn Lys Ile Trp Val Ile Pro Glu Arg  
 35 40 45  
 Asp Thr Phe Tyr Asn Asp Pro Ile Asp Asn Asp Asn Ile Ile Met Met  
 50 55 60  
 Glu Pro Pro Phe Ala Arg Gly Thr Gly Arg Tyr Tyr Lys Ala Phe Lys  
 65 70 75 80  
 Ile Thr Asp Arg Ile Trp Ile Ile Pro Glu Arg Tyr Thr Phe Gly Tyr  
 85 90 95

Lys Pro Glu Asp Phe Asn Lys Ser Ser Gly Ile Phe Asn Arg Asp Val  
 100 105 110  
 Cys Glu Tyr Tyr Asp Pro Asp Tyr Leu Asn Thr Asn Asp Lys Lys Asn  
 115 120 125  
 Ile Phe Phe Gln Thr Leu Ile Lys Leu Phe Asn Arg Ile Lys Ser Lys  
 130 135 140  
 Pro Leu Gly Glu Lys Leu Leu Glu Met Ile Ile Asn Gly Ile Pro Tyr  
 145 150 155 160  
 Leu Gly Asp Arg Arg Val Pro Leu Glu Glu Phe Asn Thr Asn Ile Ala  
 165 170 175  
 Ser Val Thr Val Asn Lys Leu Ile Ser Asn Pro Gly Glu Val Glu Arg  
 180 185 190  
 Lys Lys Gly Ile Phe Ala Asn Leu Ile Ile Phe Gly Pro Gly Pro Val  
 195 200 205  
 Leu Asn Glu Asn Glu Thr Ile Asp Ile Gly Ile Gln Asn His Phe Ala  
 210 215 220  
 Ser Arg Glu Gly Phe Gly Gly Ile Met Gln Met Lys Phe Cys Pro Glu  
 225 230 235 240  
 Tyr Val Ser Val Phe Asn Asn Val Gln Glu Asn Lys Gly Ala Ser Ile  
 245 250 255  
 Phe Asn Arg Arg Gly Tyr Phe Ser Asp Pro Ala Leu Ile Leu Met His  
 260 265 270  
 Glu Leu Ile His Val Leu His Gly Leu Tyr Gly Ile Lys Val Asp Asp  
 275 280 285  
 Leu Pro Ile Val Pro Asn Glu Lys Lys Phe Phe Met Gln Ser Thr Asp  
 290 295 300  
 Thr Ile Gln Ala Glu Glu Leu Tyr Thr Phe Gly Gly Gln Asp Pro Ser  
 305 310 315 320  
 Ile Ile Ser Pro Ser Thr Asp Lys Ser Ile Tyr Asp Lys Val Leu Gln  
 325 330 335  
 Asn Phe Arg Gly Ile Val Asp Arg Leu Asn Lys Val Leu Val Cys Ile  
 340 345 350  
 Ser Asp Pro Asn Ile Asn Ile Asn Ile Tyr Lys Asn Lys Phe Lys Asp  
 355 360 365  
 Lys Tyr Lys Phe Val Glu Asp Ser Glu Gly Lys Tyr Ser Ile Asp Val  
 370 375 380  
 Glu Ser Phe Asn Lys Leu Tyr Lys Ser Leu Met Leu Gly Phe Thr Glu  
 385 390 395 400  
 Ile Asn Ile Ala Glu Asn Tyr Lys Ile Lys Thr Arg Ala Ser Tyr Phe  
 405 410 415  
 Ser Asp Ser Leu Pro Pro Val Lys Ile Lys Asn Leu Leu Asp Asn Glu  
 420 425 430  
 Ile Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly  
 435 440 445  
 Lys Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Tyr Glu  
 450 455 460  
 Glu Ile Ser Lys Glu His Leu Ala Val Tyr Lys Ile Gln Met Cys Lys  
 465 470 475 480  
 Ser Val Lys

&lt;210&gt; 142

&lt;211&gt; 458

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(458)

&lt;223&gt; BoNT/A-BoNT/E chimeric LC

&lt;400&gt; 142

```

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
 1           5           10           15
Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
 20           25           30
Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
 35           40           45
Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
 50           55           60
Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
 65           70           75           80
Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
 85           90           95
Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
100           105           110
Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
115           120           125
Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
130           135           140
Leu Pro Asn Val Ile Ile Met Gly Ala Glu Pro Asp Leu Phe Glu Thr
145           150           155           160
Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
165           170           175
Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
180           185           190
Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
195           200           205
Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
210           215           220
Lys Gly Ile Thr Thr Lys Tyr Thr Ile Thr Gln Lys Gln Asn Pro Leu
225           230           235           240
Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
245           250           255
Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
260           265           270
Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
275           280           285
Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
290           295           300
Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305           310           315           320
Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
325           330           335
Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
340           345           350
Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
355           360           365
Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe

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      370              375              380
Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Gly Phe
385              390              395              400
Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln Asn Thr
      405              410              415
Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys Asn Phe Thr Gly Leu
      420              425              430
Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly Ile Ile Thr Ser Lys
      435              440              445
Asn Ile Val Ser Val Lys Gly Ile Arg Lys
      450              455

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&lt;210&gt; 143

&lt;211&gt; 443

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(443)

&lt;223&gt; BoNT/A-BoNT/E chimeric LC

&lt;400&gt; 143

```

Met Pro Lys Ile Asn Ser Phe Asn Tyr Met Pro Phe Val Asn Lys Gln
1              5              10              15
Phe Asn Tyr Lys Asp Pro Val Asn Gly Val Asp Ile Ala Tyr Ile Lys
      20              25              30
Ile Pro Asn Ala Gly Gln Met Tyr Ile Lys Pro Gly Gly Cys Gln Glu
      35              40              45
Phe Tyr Lys Ser Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu
      50              55              60
Arg Asn Val Ile Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser
65              70              75              80
Leu Lys Asn Gly Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser
      85              90              95
Asp Glu Glu Lys Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn
      100              105              110
Arg Ile Asn Asn Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser
      115              120              125
Lys Ala Asn Pro Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe
      130              135              140
His Ile Gly Asp Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser
145              150              155              160
Gln Asp Ile Leu Leu Pro Asn Val Ile Ile Met Gly Ala Glu Pro Asp
      165              170              175
Leu Phe Glu Thr Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met
      180              185              190
Pro Ser Asn His Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro
      195              200              205
Glu Tyr Ser Phe Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln
210              215              220
Asp Pro Ala Leu Thr Leu Met His Glu Leu Ile His Ser Leu His Gly
225              230              235              240
Leu Tyr Gly Ala Lys Gly Ile Thr Thr Lys Tyr Thr Ile Thr Gln Lys

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245 250 255  
 Gln Asn Pro Leu Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe  
 260 265 270  
 Leu Thr Phe Gly Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser  
 275 280 285  
 Asn Asp Ile Tyr Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser  
 290 295 300  
 Lys Leu Ser Lys Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys  
 305 310 315 320  
 Asp Val Phe Glu Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile  
 325 330 335  
 Tyr Ser Val Asn Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr  
 340 345 350  
 Ser Phe Thr Glu Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg  
 355 360 365  
 Gln Thr Tyr Ile Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu  
 370 375 380  
 Asn Asp Ser Ile Tyr Asn Ile Ser Glu Gly Phe Asn Leu Arg Asn Thr  
 385 390 395 400  
 Asn Leu Ala Ala Asn Phe Asn Gly Gln Asn Thr Glu Ile Asn Asn Met  
 405 410 415  
 Asn Phe Thr Lys Leu Lys Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys  
 420 425 430  
 Leu Leu Cys Val Arg Gly Ile Ile Thr Ser Lys  
 435 440

&lt;210&gt; 144

&lt;211&gt; 461

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(461)

&lt;223&gt; BoNT/A-BoNT/B chimeric LC

&lt;400&gt; 144

Met Pro Val Thr Ile Asn Asn Phe Asn Met Pro Phe Val Asn Lys Gln  
 1 5 10 15  
 Phe Asn Tyr Lys Asp Pro Val Asn Gly Val Asp Ile Ala Tyr Ile Lys  
 20 25 30  
 Ile Pro Asn Ala Gly Gln Met Ile Met Met Glu Pro Pro Phe Ala Arg  
 35 40 45  
 Gly Thr Gly Arg Tyr Tyr Lys Ala Phe Lys Ile Thr Asp Arg Ile Trp  
 50 55 60  
 Ile Ile Pro Glu Arg Tyr Thr Phe Gly Tyr Lys Pro Glu Asp Phe Asn  
 65 70 75 80  
 Lys Ser Ser Gly Ile Phe Asn Arg Asp Val Cys Glu Tyr Tyr Asp Pro  
 85 90 95  
 Asp Tyr Leu Asn Thr Asn Asp Lys Lys Asn Ile Phe Phe Gln Thr Leu  
 100 105 110  
 Ile Lys Leu Phe Asn Arg Ile Lys Ser Lys Pro Leu Gly Glu Lys Leu  
 115 120 125  
 Leu Glu Met Ile Ile Asn Gly Ile Pro Tyr Leu Gly Asp Arg Arg Val

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      130              135              140
Pro Leu Glu Glu Phe Asn Thr Asn Ile Ala Ser Val Thr Val Asn Lys
145              150              155              160
Leu Ile Ser Asn Pro Gly Glu Val Glu Arg Lys Lys Gly Ile Phe Ala
      165              170              175
Asn Leu Ile Ile Phe Gly Pro Gly Pro Val Leu Asn Glu Asn Glu Thr
      180              185              190
Ile Asp Ile Gly Ile Gln Asn His Phe Ala Ser Arg Glu Gly Phe Gly
      195              200              205
Gly Ile Met Gln Met Lys Phe Cys Pro Glu Tyr Val Ser Val Phe Asn
      210              215              220
Asn Val Gln Glu Asn Lys Gly Ala Ser Ile Phe Asn Arg Arg Gly Tyr
      225              230              235              240
Phe Ser Asp Pro Ala Leu Ile Leu Met His Glu Leu Ile His Val Leu
      245              250              255
His Gly Leu Tyr Gly Ile Lys Val Asp Asp Leu Pro Ile Val Pro Asn
      260              265              270
Glu Lys Lys Phe Phe Met Gln Ser Thr Asp Thr Ile Gln Ala Glu Glu
      275              280              285
Leu Tyr Thr Phe Gly Gly Gln Asp Pro Ser Ile Ile Ser Pro Ser Thr
      290              295              300
Asp Lys Ser Ile Tyr Asp Lys Val Leu Gln Asn Phe Arg Gly Ile Val
      305              310              315
Asp Arg Leu Asn Lys Val Leu Val Cys Ile Ser Asp Pro Asn Ile Asn
      320              325              330              335
Ile Asn Ile Tyr Lys Asn Lys Phe Lys Asp Lys Tyr Lys Phe Val Glu
      340              345              350
Asp Ser Glu Gly Lys Tyr Ser Ile Asp Val Glu Ser Phe Asn Lys Leu
      355              360              365
Tyr Lys Ser Leu Met Leu Gly Phe Thr Glu Ile Asn Ile Ala Glu Asn
      370              375              380
Tyr Lys Ile Lys Thr Arg Ala Ser Tyr Phe Ser Asp Ser Leu Pro Pro
      385              390              395              400
Val Lys Ile Lys Asn Leu Leu Asp Asn Glu Ile Gly Phe Asn Leu Arg
      405              410              415
Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln Asn Thr Glu Ile Asn
      420              425              430
Asn Met Asn Phe Thr Lys Leu Lys Asn Phe Thr Gly Leu Phe Glu Phe
      435              440              445
Tyr Lys Leu Leu Cys Val Arg Gly Ile Ile Thr Ser Lys
      450              455              460

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&lt;210&gt; 145

&lt;211&gt; 456

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(456)

&lt;223&gt; BoNT/A-BoNT/F chimeric LC

&lt;400&gt; 145

Met Pro Val Ala Ile Asn Ser Phe Asn Met Pro Phe Val Asn Lys Gln

1	5	10	15
Phe Asn Tyr Lys Asp Pro Val Asn Gly Val Asp Ile Ala Tyr Ile Lys			
	20	25	30
Ile Pro Asn Ala Gly Gln Met Leu Tyr Met Gln Ile Pro Tyr Glu Glu			
	35	40	45
Lys Ser Lys Lys Tyr Tyr Lys Ala Phe Glu Ile Met Arg Asn Val Trp			
	50	55	60
Ile Ile Pro Glu Arg Asn Thr Ile Gly Thr Asn Pro Ser Asp Phe Asp			
65	70	75	80
Pro Pro Ala Ser Leu Lys Asn Gly Ser Ser Ala Tyr Tyr Asp Pro Asn			
	85	90	95
Tyr Leu Thr Thr Asp Ala Glu Lys Asp Arg Tyr Leu Lys Thr Thr Ile			
	100	105	110
Lys Leu Phe Lys Arg Ile Asn Ser Asn Pro Ala Gly Lys Val Leu Leu			
	115	120	125
Gln Glu Ile Ser Tyr Ala Lys Pro Tyr Leu Gly Asn Asp His Thr Pro			
	130	135	140
Ile Asp Glu Phe Ser Pro Val Thr Arg Thr Thr Ser Val Asn Ile Lys			
145	150	155	160
Leu Ser Thr Asn Val Glu Ser Ser Met Leu Leu Asn Leu Leu Val Leu			
	165	170	175
Gly Ala Gly Pro Asp Ile Phe Glu Ser Cys Cys Tyr Pro Val Arg Lys			
	180	185	190
Leu Ile Asp Pro Asp Val Val Tyr Asp Pro Ser Asn Tyr Gly Phe Gly			
	195	200	205
Ser Ile Asn Ile Val Thr Phe Ser Pro Glu Tyr Glu Tyr Thr Phe Asn			
	210	215	220
Asp Ile Ser Gly Gly His Asn Ser Ser Thr Glu Ser Phe Ile Ala Asp			
225	230	235	240
Pro Ala Ile Ser Leu Ala His Glu Leu Ile His Ala Leu His Gly Leu			
	245	250	255
Tyr Gly Ala Arg Gly Val Thr Tyr Glu Glu Thr Ile Glu Val Lys Gln			
	260	265	270
Ala Pro Leu Met Ile Ala Glu Lys Pro Ile Arg Leu Glu Glu Phe Leu			
	275	280	285
Thr Phe Gly Gly Gln Asp Leu Asn Ile Ile Thr Ser Ala Met Lys Glu			
	290	295	300
Lys Ile Tyr Asn Asn Leu Leu Ala Asn Tyr Glu Lys Ile Ala Thr Arg			
305	310	315	320
Leu Ser Glu Val Asn Ser Ala Pro Pro Glu Tyr Asp Ile Asn Glu Tyr			
	325	330	335
Lys Asp Tyr Phe Gln Trp Lys Tyr Gly Leu Asp Lys Asn Ala Asp Gly			
	340	345	350
Ser Tyr Thr Val Asn Glu Asn Lys Phe Asn Glu Ile Tyr Lys Lys Leu			
	355	360	365
Tyr Ser Phe Thr Glu Ser Asp Leu Ala Asn Lys Phe Lys Val Lys Cys			
	370	375	380
Arg Asn Thr Tyr Phe Ile Lys Tyr Glu Phe Leu Lys Val Pro Asn Leu			
385	390	395	400
Leu Asp Asp Asp Ile Tyr Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala			
	405	410	415
Ala Asn Phe Asn Gly Gln Asn Thr Glu Ile Asn Asn Met Asn Phe Thr			
	420	425	430
Lys Leu Lys Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys			
	435	440	445

Val Arg Gly Ile Ile Thr Ser Lys  
450 455

<210> 146  
<211> 449  
<212> PRT  
<213> Artificial Sequence

<220>  
<221> DOMAIN  
<222> (1)...(449)  
<223> BoNT/A-BoNT/E chimeric LC

<400> 146  
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Thr Ile Asn  
1 5 10 15  
Asn Phe Asn Tyr Asp Arg Thr Ile Leu Tyr Ile Lys Pro Gly Cys  
20 25 30  
Gln Glu Phe Tyr Lys Ser Phe Asn Ile Met Lys Asn Ile Trp Ile Ile  
35 40 45  
Pro Glu Arg Asn Val Ile Gly Thr Thr Pro Gln Asp Phe His Pro Pro  
50 55 60  
Thr Ser Leu Lys Asn Gly Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu  
65 70 75 80  
Gln Ser Asp Glu Glu Lys Asp Arg Phe Leu Lys Ile Val Thr Lys Ile  
85 90 95  
Phe Asn Arg Ile Asn Asn Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu  
100 105 110  
Leu Ser Lys Ala Asn Pro Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn  
115 120 125  
Gln Phe His Ile Gly Asp Ala Ser Ala Val Glu Ile Lys Phe Ser Asn  
130 135 140  
Gly Ser Gln Asp Ile Leu Leu Pro Asn Val Ile Ile Met Gly Ala Glu  
145 150 155 160  
Pro Asp Leu Phe Glu Thr Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn  
165 170 175  
Tyr Met Pro Ser Asn His Gly Phe Gly Ser Ile Ala Ile Val Thr Phe  
180 185 190  
Ser Pro Glu Tyr Ser Phe Arg Phe Asn Asp Asn Ser Met Asn Glu Phe  
195 200 205  
Ile Gln Asp Pro Ala Leu Thr Leu Met His Glu Leu Ile His Ser Leu  
210 215 220  
His Gly Leu Tyr Gly Ala Lys Gly Ile Thr Thr Lys Tyr Thr Ile Thr  
225 230 235 240  
Gln Lys Gln Asn Pro Leu Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu  
245 250 255  
Glu Phe Leu Thr Phe Gly Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala  
260 265 270  
Gln Ser Asn Asp Ile Tyr Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile  
275 280 285  
Ala Ser Lys Leu Ser Lys Val Gln Val Ser Asn Pro Leu Leu Asn Pro  
290 295 300  
Tyr Lys Asp Val Phe Glu Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser  
305 310 315 320

Gly Ile Tyr Ser Val Asn Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys  
 325 330 335  
 Leu Tyr Ser Phe Thr Glu Phe Asp Leu Ala Thr Lys Phe Gln Val Lys  
 340 345 350  
 Cys Arg Gln Thr Tyr Ile Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn  
 355 360 365  
 Leu Leu Asn Asp Ser Ile Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn  
 370 375 380  
 Asn Leu Lys Val Asn Phe Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg  
 385 390 395 400  
 Ile Ile Thr Pro Ile Thr Gly Arg Gly Leu Val Lys Lys Ile Ile Arg  
 405 410 415  
 Phe Cys Lys Asn Asn Met Asn Phe Thr Lys Leu Lys Asn Phe Thr Gly  
 420 425 430  
 Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly Ile Ile Thr Ser  
 435 440 445  
 Lys

&lt;210&gt; 147

&lt;211&gt; 459

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; DOMAIN

&lt;222&gt; (1)...(459)

&lt;223&gt; BoNT/A-BoNT/B-BoNT/F chimeric LC

&lt;400&gt; 147

Met Pro Val Ala Ile Asn Ser Phe Asn Tyr Asn Asp Val Thr Ile Asn  
 1 5 10 15  
 Asn Phe Asn Tyr Thr Ile Leu Tyr Met Gln Ile Pro Tyr Glu Glu Lys  
 20 25 30  
 Ser Lys Lys Tyr Tyr Lys Ala Phe Glu Ile Met Arg Asn Val Trp Ile  
 35 40 45  
 Ile Pro Glu Arg Asn Thr Ile Gly Thr Asn Pro Ser Asp Phe Asp Pro  
 50 55 60  
 Pro Ala Ser Leu Lys Asn Gly Ser Ser Ala Tyr Tyr Asp Pro Asn Tyr  
 65 70 75 80  
 Leu Thr Thr Asp Ala Glu Lys Asp Arg Tyr Leu Lys Thr Thr Ile Lys  
 85 90 95  
 Leu Phe Lys Arg Ile Asn Ser Asn Pro Ala Gly Lys Val Leu Leu Gln  
 100 105 110  
 Glu Ile Ser Tyr Ala Lys Pro Tyr Leu Gly Asn Asp His Thr Pro Ile  
 115 120 125  
 Asp Glu Phe Ser Pro Val Thr Arg Thr Thr Ser Val Asn Ile Lys Leu  
 130 135 140  
 Ser Thr Asn Val Glu Ser Ser Met Leu Leu Asn Leu Leu Val Leu Gly  
 145 150 155 160  
 Ala Gly Pro Asp Ile Phe Glu Ser Cys Cys Tyr Pro Val Arg Lys Leu  
 165 170 175  
 Ile Asp Pro Asp Val Val Tyr Asp Pro Ser Asn Tyr Gly Phe Gly Ser  
 180 185 190

Ile Asn Ile Val Thr Phe Ser Pro Glu Tyr Glu Tyr Thr Phe Asn Asp  
 195 200 205  
 Ile Ser Gly Gly His Asn Ser Ser Thr Glu Ser Phe Ile Ala Asp Pro  
 210 215 220  
 Ala Ile Ser Leu Ala His Glu Leu Ile His Ala Leu His Gly Leu Tyr  
 225 230 235 240  
 Gly Ala Arg Gly Val Thr Tyr Glu Glu Thr Ile Glu Val Lys Gln Ala  
 245 250 255  
 Pro Leu Met Ile Ala Glu Lys Pro Ile Arg Leu Glu Glu Phe Leu Thr  
 260 265 270  
 Phe Gly Gly Gln Asp Leu Asn Ile Ile Thr Ser Ala Met Lys Glu Lys  
 275 280 285  
 Ile Tyr Asn Asn Leu Leu Ala Asn Tyr Glu Lys Ile Ala Thr Arg Leu  
 290 295 300  
 Ser Glu Val Asn Ser Ala Pro Pro Glu Tyr Asp Ile Asn Glu Tyr Lys  
 305 310 315 320  
 Asp Tyr Phe Gln Trp Lys Tyr Gly Leu Asp Lys Asn Ala Asp Gly Ser  
 325 330 335  
 Tyr Thr Val Asn Glu Asn Lys Phe Asn Glu Ile Tyr Lys Lys Leu Tyr  
 340 345 350  
 Ser Phe Thr Glu Ser Asp Leu Ala Asn Lys Phe Lys Val Lys Cys Arg  
 355 360 365  
 Asn Thr Tyr Phe Ile Lys Tyr Glu Phe Leu Lys Val Pro Asn Leu Leu  
 370 375 380  
 Asp Asp Asp Ile Tyr Thr Val Ser Glu Gly Phe Asn Ile Gly Asn Leu  
 385 390 395 400  
 Ala Val Asn Asn Arg Gly Gln Ser Ile Lys Leu Asn Pro Lys Ile Ile  
 405 410 415  
 Asp Ser Ile Pro Asp Lys Gly Leu Val Glu Lys Asn Asn Met Asn Phe  
 420 425 430  
 Thr Lys Leu Lys Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu  
 435 440 445  
 Cys Val Arg Gly Ile Ile Thr Ser Lys Arg Lys  
 450 455

&lt;210&gt; 148

&lt;211&gt; 59

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; PEPTIDE

&lt;222&gt; (1)...(59)

&lt;223&gt; Peptide comprising a 6x His tag and 8-tag

&lt;400&gt; 148

Met His His His His His Ser Ser Gly Leu Val Pro Arg Gly Ser  
 1 5 10 15  
 Gly Met Lys Glu Thr Ala Ala Lys Phe Glu Arg Gln His Met Asp  
 20 25 30  
 Ser Pro Asp Leu Gly Thr Asp Asp Asp Lys Ala Met Gly Ser Phe  
 35 40 45  
 Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val  
 50 55